



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/826,676	04/05/2001	Jin-Wen Tzeng	P-1026	3516

7590 02/27/2002

James R. Cartiglia  
Graftech Inc.  
3102 West End Avenue, Suite 1100  
Nashville, TN 37203

EXAMINER

COSTANZO, PATRICIA M

ART UNIT PAPER NUMBER

2811

DATE MAILED: 02/27/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/826,676

Applicant(s)

TZENG ET AL.

Examiner

Patricia M. Costanzo

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1 - 20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 - 20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 April 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Information Disclosure Statement*

1. The information disclosure statement (IDS) filed July 6, 2001 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. No copy of International Publication No. WO 99/35196 is in the file.

Therefore, the above-identified IDS has been placed in the application file, but the information referred to therein has not been considered.

### *Claim Objections*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 recites the limitation " the particles of graphite " in the last line of the claim. There is insufficient antecedent basis for this limitation in the claim.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in:

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United

Art Unit: 2811

States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

4. Claims 1 – 3, 5, 7, and 8, in as much as Claims 1 – 3, 5, 7, and 8 are in compliance with 35 U.S.C. 112, are rejected under 35 U.S.C. 102(e) as being anticipated by United States Patent No. 6,075,287 (Ingraham *et al.*). See Figures 1 - 3 and respective portions of the Ingraham *et al.* specification.

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Referring to Claim 1: Ingraham *et al.* disclose an isolated thermal interface (see, for example, Col. 3, line 57 - 65) comprising:

a flexible graphite sheet (12) and (12a) having two major surfaces, at least one of the major surfaces coated with a protective coating (16) sufficient to inhibit flaking of particles of graphite .

Referring to Claim 2: Ingraham *et al.* disclose an isolated thermal interface, as recited above, further disclosing wherein the protective coating comprises a thermoplastic material (see, for example, Col. 5, line 31).

Referring to Claim 3: Ingraham *et al.* disclose an isolated thermal interface, as recited above, and further disclose wherein the thermal plastic comprises polyimide (see, for example, Col. 5, line 31).

Referring to Claim 5: Ingraham et al. disclose an isolated thermal interface, as recited above, further disclosing wherein the protective coating is effective to electrically isolate the coated major surface of the sheet of flexible graphite particles (see, for example, Col. 5, lines 24 - 28).

Referring to Claim 7: Ingraham et al. disclose an isolated thermal interface, as recited above, further disclosing wherein the interface comprises a layer of adhesive interposed between the protective coating and the flexible sheet of graphite (see, for example, Col. 5, lines 30 - 35).

Referring to Claim 8: Ingraham et al. disclose an isolated thermal interface, as recited above, further disclosing wherein the adhesive is selected from the group consisting of acrylic and latex materials (see, for example, Col.5, line 32).

5. Claim 10 is rejected under 35 U.S.C. 102(e) being anticipated by United States Patent No. 5,834,337 (Unger *et al.*) (see Figures 1 - 2 and respective portions of the Unger *et al.* specification).

Unger *et al.* disclose a process (see, for example, Claims 1 - 3) for producing a thermal interface having a protective coating sufficient to inhibit flaking of the particles of graphite (see, for example, Col. 4, lines 13 -17 and Claim 14), the process comprising (a) forming a flexible graphite sheet into the size and shape desired for a thermal interface (Col. 2, lines 59 - 57), wherein the formed flexible graphite sheet has at least one major surface and at least one

edge surface (see, for example, Figure 2; and (b) coating the formed flexible graphite sheet with a material to form a protective coating, such that the material forms a protective boundary about the flexible graphite sheet (see, for example, Col. 4, lines 13 - 15).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
7. Claims 4, 6, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,333,557 (Ingraham et al.). See Figures 1 - 27 and respective portions of the Ingraham et al. specification. In addition, see United States Patent No. 5,834,337 (Unger et al.) Figures 1 - 2 and respective portions of the Unger et al. specification.

Referring to Claims 4 and 9: Ingraham et al. disclose an isolated thermal interface, as recited above, except for disclosing wherein the protective coating is no more than about 0.025 millimeters referring to Claim 4, and no more than 0.015 millimeters referring to Claim 9.

It was well known by those of ordinary skill in the art at the time the invention was made that most protective coating materials having sufficient electrical insulating properties also have thermal insulating properties.

Therefore, it would have been obvious, at that time, to modify the apparatus disclosed by Ingraham et al. by providing for a protective coating having a thickness no more than about 0.025 or 0.015 millimeters so as to obtain the advantage of having desired electrical insulation while simultaneously maintaining the maximum amount of thermal conductivity.

Referring to Claim 6: Ingraham et al. disclose an isolated thermal interface, as recited above, except for explicitly disclosing wherein the flexible graphite sheet is coated with a protective coating sufficient to inhibit flaking of particles of graphite

The ability of graphite to "flake", *i.e.*, to exfoliate was well known by those of ordinary skill in the art at the time the invention was made. It is the exfoliation property of graphite that has, and still does, make it so desirable for use in the making of "lead" pencils. In actuality, lead pencils do not use lead to make marks on a surface such as paper rather they use graphite. Due to the weak bonding between graphite's planar surfaces, only very minor forces need be applied to

graphite to cause it to exfoliate, thus making graphite ideal for use as a marking medium in pencils. This ease of exfoliation, however, means that graphite will exfoliate, or flake, easily whenever the graphite is subjected to even a very small shearing force. In fact, it is for this reason that graphite has been, and still is, used as a lubricant.

Therefore, it would have been obvious to those of ordinary skill in the art at the time of the invention, to modify the apparatus disclosed by Ingraham et al. by providing for a coating over the graphite to obtain the advantage of protecting the immediate environment from contamination by exfoliated flakes of graphite. See, Unger *et al.*, Col. 4, lines 13 – 17, for support of the above.

8. Claims 12, 14, 17, and 20 are rejected under 35 U.S.C. 103(a) being obvious over United States Patent No. 5,834,337 (Unger *et al.*) (see Figures 1 - 2 and respective portions of the Unger *et al.* specification).

Referring to Claim 12: Unger *et al.* disclose a process, as recited above, except for explicitly disclosing wherein the material is coated on the formed flexible graphite sheet by spray coating, roller coating, or hot laminating press.

Coating by spray coating, roller coating, or the hot laminating press method was well known by those of ordinary skill in the art at the time the invention was made.

Therefore, it would have been obvious to those of ordinary skill in the art at the time of the invention, to modify the process disclosed by Unger et al. by



providing for a coating over the graphite by using the method of spray coating, roller coating, or hot laminating press to obtain the advantage of protecting the immediate environment from contamination by exfoliated flakes of graphite.

Referring to Claim 14: Unger *et al.* disclose a process, as recited above, except for explicitly disclosing wherein the material is coated on the formed flexible graphite sheet by roller coating, laminating with adhesive, or hot press laminating, and then cutting the formed flexible graphite sheet into the desired size and shape of the thermal interface.

As discussed above, coating by spray coating, roller coating, or the hot laminating press method was well known by those of ordinary skill in the art at the time the invention was made. And, although Unger *et al.* do not specifically disclose cutting the formed flexible graphite sheet into the desired size and shape of the thermal interface subsequent to the coating process, they do teach that the "heat transfer element can take a number of forms". Thus, It would have been obvious to coat the graphite either prior to, or subsequent to, cutting the formed sheet into the desired size and shape as this would involve only a mere change in the order of the steps of the process, which involves only routine skill in the art.

Referring to Claim 17 and 20: Unger *et al.* disclose a process, as recited above, except for disclosing wherein the material is no more than 0.025 millimeters or 0.015

millimeters in thickness (see, for example, Col. 2, line 17 in conjunction with Col. 3, lines 10 - 14).

It was well known by those of ordinary skill in the art at the time the invention was made that most protective coating materials having sufficient electrical insulating properties also have thermal insulating properties.

Therefore, it would have been obvious, at that time, to modify the apparatus disclosed by Unger *et al.* by providing for a protective coating having a thickness no more that about 0.025 or 0.015 millimeters so as to obtain the advantage of having desired electrical insulation while simultaneously maintaining the maximum amount of thermal conductivity.

9. Claims 11 and 13 are rejected under 35 U.S.C. 103(a) being obvious over United States Patent No. 5,834,337 (Unger *et al.*) (see Figures 1 - 2 and respective portions of the Unger *et al.* specification) in view of United States Patent No. 5,650,592 (Cheskis *et al.*) (see Figures 1 - 3 and respective portions of the Cheskis *et al.* specification).

Referring to Claim 11: Unger *et al.* disclose a process, as recited above, except for explicitly disclosing wherein the material is coated on the formed flexible graphite sheet so as to flow completely about at least one of the major surfaces and at least one of the edge surfaces of the sheet, and extend beyond at least one of the edge surfaces of the sheet.

Cheskis *et al.* discloses wherein the material is coated on the formed flexible graphite sheet so as to flow completely about at least one of the major surfaces and at least one of the edge surfaces of the sheet, and extend beyond at least one of the edge surfaces of the sheet (see, for example, Cheskis *et al.* (22)).

Therefore, it would have been obvious to those of ordinary skill in the art at the time of the invention, to modify the process disclosed by Unger *et al.* by providing for a coating over the graphite as disclosed by Cheskis *et al.* to obtain the advantage of protecting the immediate environment from contamination by exfoliated flakes of graphite.

Referring to Claim 13: Unger *et al.* disclose a process, as recited above, except for explicitly disclosing wherein the material is coated on the formed flexible graphite sheet on at least one of its major surfaces.

Cheskis *et al.* discloses wherein the material is coated on the formed flexible graphite sheet on at least one of the major surfaces (see, for example, Col. 4, lines 50 - 52).

Therefore, it would have been obvious to those of ordinary skill in the art at the time of the invention, to modify the process disclosed by Unger *et al.* by providing for a coating over the graphite as disclosed by Cheskis *et al.* to obtain the advantage of protecting the immediate environment from contamination by exfoliated flakes of graphite.

10. Claims 15, 16, 18, and 19 are rejected under 35 U.S.C. 103(a) being obvious over United States Patent No. 5,834,337 (Unger *et al.*) (see Figures 1 - 2 and respective portions of the Unger *et al.* specification) in view of United States Patent No. 6,075,287 (Ingraham *et al.*). See Figures 1 - 27 and respective portions of the Ingraham *et al.* specification.

Referring to Claim 15: Unger *et al.* discloses a process, as recited above, except for disclosing wherein the material comprises a thermoplastic material.

Ingraham *et al.* disclose wherein the material comprises a thermoplastic material (see, for example, Col. 5, line 31).

Therefore, it would have been obvious to those of ordinary skill in the art at the time of the invention, to modify the process disclosed by Unger *et al.* by providing for a coating over the graphite using a thermoplastic material as it was well known to do so.

Referring to Claim 16: Unger *et al.* disclose a process, as recited above, except for disclosing wherein the material comprises polyimide (see, for example, Col. 2, line 17 in conjunction with Col. 3, lines 10 - 14).

Ingraham *et al.* disclose wherein the material comprises polyimide (see, for example, Col. 5, line 31).

Therefore, it would have been obvious to those of ordinary skill in the art at the time of the invention, to modify the process disclosed by Unger *et al.* by

providing for a coating over the graphite using polyimide as it was well known to do so.

Referring to Claim 18: Unger *et al.* disclose a process, as recited above, except for disclosing wherein an adhesive is coated on the formed flexible graphite sheet between the material and the formed flexible graphite sheet.

Ingraham *et al.* disclose an adhesive coated on the formed flexible graphite sheet between the material and the formed flexible graphite sheet (see, for example, Col. 5, lines 30 – 35).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process as disclosed by Unger *et al.* by providing for an adhesive coated on the formed flexible graphite sheet between the material and the formed flexible graphite sheet as disclosed by Ingraham *et al.* as it was well-known to do so.

Referring to Claim 19: Unger *et al.* disclose a process, as recited above, except for disclosing wherein the adhesive comprises an acrylic or a latex material.

Ingraham *et al.* disclose wherein the adhesive comprises an acrylic or a latex material (see, for example, Col.5, line 32).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process as disclosed by Unger *et al.* by providing for an adhesive of acrylic or a latex as disclosed by Ingraham *et al.* as it was well-known to do so.

Art Unit: 2811

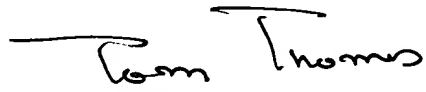
### Conclusion

Any inquiry concerning this communication should be directed to Patricia Costanzo at 703 305-5675 on Monday – Friday from 8:00 A.M. – 5:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful Supervisory Primary Examiner Tom Thomas can be reached at 703 308 -2772.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist at 703 308-095.

pmc  
February 13, 2002

  
**TOM THOMAS**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2800**